

New York is meeting its nitrogen targets for the Chesapeake Bay TMDL: Technical summary.

In April 2019, the New York Department of Environmental Conservation (DEC) submitted its draft Phase III Watershed Implementation Plan (WIP) for the Chesapeake Bay partnership to the U.S. Environmental Protection Agency (EPA). The draft Phase III WIP was developed to make progress toward the final nitrogen, phosphorus, and sediment targets mutually agreed to by the involved jurisdictions within the framework of the Chesapeake Bay Total Maximum Daily Load (Bay TMDL). New York received an EPA evaluation of New York's draft Phase III WIP in June 2019. New York incorporated many of EPA's recommended enhancements and submitted the final Phase III WIP in August 2019. A final EPA evaluation of New York's Phase III WIP, with recommended actions to be included in New York's 2020-2021 milestones, was received by DEC in December 2019. New York submitted final 2020-2021 milestones to EPA in May 2020.

As discussed throughout development of the Phase III WIP, New York is committed to executing a level of implementation consistent with its efforts during the Phase II WIP period (2010 to 2017). If New York were to achieve its 2025 nitrogen target only through additional project implementation, it would require substantial increases in funding for project implementation and staffing for oversight/reporting. New York has been working diligently with EPA to legitimately account for the needed 1-million-pounds in additional nitrogen reductions set forth in the TMDL model, through additional actions identified in the 2020-2021 programmatic milestones. This amount is consistent with New York's 2025 nitrogen target.

Since New York's final Phase III WIP was submitted to EPA in August 2019, New York has identified additional reductions from the wastewater sector that will almost completely close the nitrogen "gap." The remainder of the nitrogen gap will be closed using a nutrient exchange between phosphorus and nitrogen. The nutrient exchange will be done pursuant to the approved method set forth in the TMDL. Therefore, as detailed below, New York is on track to fully achieve its nitrogen target under the Chesapeake Bay partnership by 2025.

"CAST-19" Updated Model to Prior Model "CAST 17"

Upgrades to the CAST model (CAST-19) were approved by the Chesapeake Bay Program Partnership in July 2020. When NY's final August 2019 Phase III WIP is processed through the updated model, nitrogen is reduced by an additional 180,000 pounds and phosphorus remains essentially unchanged (Table 1).

Table 1. Change in TN and TP loads from CAST-17 to CAST-19.

Scenario	TN (million lbs./yr.)	TP (million lbs./yr.)
NY Final August 2019 Phase III WIP Evaluated under CAST-17	12.53	0.544
NY Final August 2019 Phase III WIP Evaluated under CAST-19	12.35	0.544
Reduction in NY Loading from CAST-17 to CAST-19 update	0.18	0.000

Updated Wastewater Estimates to Meet Nitrogen Gap

When developing its August 2019 Phase III WIP wastewater scenario, DEC took the unduly conservative approach of estimating 2025 nitrogen discharges from New York wastewater facilities based upon full design flows (instead of actual flows). Most of these facilities operate well below design flow and given the current and long-trending decline in population in this part of New York, flows are likely to stay at or below current actual flows in the future. For example, a Cornell University study¹ in 2018 forecasted a decline of 1.4 percent total population between 2020 and 2025 in New York's Southern Tier (the Upper Susquehanna River's basin). The population trend for New York presented in the Chesapeake Bay Phase 6 model from 1970-2030² (Figure 1) also shows a declining population trend.

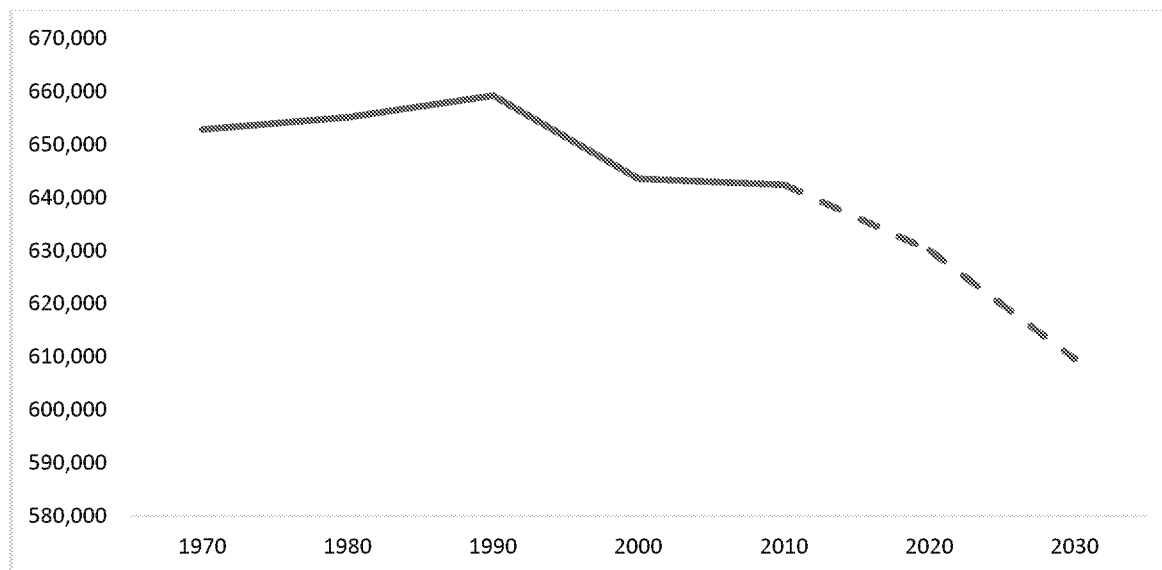


Figure 1. Phase 6 Model New York Population Projection (1970-2030).

County specific data³ has shown population declines in every New York county within the watershed, except for Tompkins County (due to growth in the City of Ithaca, which is outside of the Chesapeake Bay watershed).

To better estimate the forecasted wastewater load in 2025, New York calculated the 3-year average actual flow from 2017-2019 for wastewater facilities within the watershed. Using the actual average flow, it is estimated that New York will deliver 764,000 pounds of nitrogen and 51,000 pounds of phosphorus less to the Chesapeake Bay per year compared to DEC's August 2019 Phase III WIP wastewater scenario. This reduction, based on actual flows, is a more accurate representation of long-term wastewater loads from New York. Other jurisdictions (PA, DC, MD, WV) took this approach of citing actual flows when developing their Phase III WIPs. New York now intends to do the same.

Reductions from CAST-19, plus the updated wastewater scenario, are summarized in the Table 2 below:

¹ [[HYPERLINK "https://pad.human.cornell.edu/counties/projections.cfm"](https://pad.human.cornell.edu/counties/projections.cfm)]

² EPA Chesapeake Bay Program [[HYPERLINK "https://www.chesapeakebay.net/state/population"](https://www.chesapeakebay.net/state/population)]

³ NYS Department of Labor [[HYPERLINK "https://data.ny.gov/Government-Finance/Annual-Population-Estimates-for-New-York-State-and-krt9-ym2k"](https://data.ny.gov/Government-Finance/Annual-Population-Estimates-for-New-York-State-and-krt9-ym2k)].

Table 2. Reduction from CAST-19 Model Update and More Accurate Revised Wastewater Loadings.

Scenario	TN (million lbs./yr.)	TP (million lbs./yr.)
August 2019 Phase III WIP Evaluated under CAST-19, wastewater loads measured at full design flow	12.35	0.544
August 2019 Phase III WIP CAST-19, wastewater loads measured at average actual flow	11.59	0.493
Reduction from updated wastewater loads	0.76	0.051
Total Reduction in NY Loading from CAST-17 to CAST-19 update plus updated wastewater loads	0.94	0.051

When measured against the 2025 targets for nitrogen and phosphorus, the “August 2019 Phase III WIP CAST-19, wastewater loads measured at average flow” scenario is 60,000 pounds short of meeting the nitrogen target but overachieves on phosphorus by 94,000 pounds (Table 3).

Table 3. Comparison of August 2019 Phase III WIP CAST-19, Plus Accurate Wastewater Loads to 2025 targets for NY.

Scenario	TN (million lbs./yr.)	TP (million lbs./yr.)
August 2019 Phase III WIP CAST-19, Plus Accurate Wastewater Loads	11.59	0.493
NY Nutrient Targets (2025)	11.53	0.587
Remaining Reductions Needed	0.06	-0.094

Nutrient Exchange of Phosphorus for Nitrogen Allowed by TMDL

New York’s final August 2019 Phase III WIP reduced phosphorus pollution below New York’s 2025 phosphorus target by 47,000 pounds. Under the new wastewater scenario described above (average flows), New York will reduce phosphorus pollution below its 2025 target by about 94,000 pounds. The Chesapeake Bay Program Partnership allows phosphorus to be exchanged for nitrogen. By exchanging phosphorus for nitrogen using the approved method, New York will receive a credit of 220,000 pounds of nitrogen. This will be added to the existing 2025 nitrogen target (Table 4).

Table 4. Revised Planning Targets with Nutrient Exchange.

Scenario	TN (million lbs./yr.)	TP (million lbs./yr.)
NY Nutrient Targets (2025)	11.53	0.587
Excess Phosphorus Reduction converted to Nitrogen using N:P Ratio ⁴	-0.22	0.094
Revised NY 2025 Planning Targets with Nutrient Exchange	11.75	0.493

By comparing the Revised NY 2025 Planning Targets with Nutrient Exchange to the “August 2019 Phase III WIP CAST-19, Plus Accurate Wastewater Loads” scenario, NY will close the remaining nitrogen gap and now exceed New York’s nitrogen target reduction by approximately 160,000 pounds (Table 5).

Table 5. Excess Total Nitrogen and Phosphorus Reductions.

Scenario	TN (million lbs./yr.)	TP (million lbs./yr.)
Revised NY 2025 Planning Targets with Nutrient Exchange	11.75	0.493
August 2019 Phase III WIP CAST-19, Plus Accurate Wastewater Loads	11.59	0.493
Excess Total Nitrogen and Phosphorus Reductions	0.16	0

Summary

The combination of CAST model updates, the revised wastewater scenario, and nutrient exchange will allow New York to not only meet, but exceed, New York’s 2025 nitrogen target. This closes the 1 million-pound “gap” for nitrogen from the final August 2019 Phase III WIP. With these changes accounted for, New York will not only meet, but will exceed and maintain its pollution reduction commitments under the Chesapeake Bay partnership.

⁴ [HYPERLINK

"https://www.chesapeakebay.net/channel_files/28679/final_approved_phase_3_planning_targets_2018_07_09.xlsx"]